standing work, but he wrote many medical papers, publishing the chief of them in the Guy's Hospital Reports. He contributed the article on Harvey in the "Encyclopædia Britannica," and delivered the Harveian oration in 1893. He was an admirable speaker, always saying just the right thing in just the right way. Nothing could have been better than the speech he made at the dinner given to Sir Samuel Wilks by his many admirers when he became a baronet.

Pye-Smith's honesty, his high ideals, his geniality, his affection for all learning—modern or ancient, medical or non-medical—and his many kindnesses especially to younger members of the profession, gave him troops of friends, and no one took more pleasure than he in getting them around him. All who knew him admired and liked him. Unhappily, illness kept him in retirement for several years before his death on May 23. In 1894 he married Gertrude, the youngest daughter of the late Arthur Foulger. She and their only child—a son—survive him.

## NOTES.

The Croonian Lecture of the Royal Society will be delivered on Thursday, June 11, by Prof. E. B. Wilson, of Columbia University, on the bearing of cytological research on heredity.

The Institution of Electrical Engineers will hold a conversazione at the Natural History Museum, South Kensington, on Thursday, June 25. A conversazione of the Institution of Civil Engineers will be held at the institution on Thursday, July 2.

Prof. Metchnikoff, of the Pasteur Institute, is to be presented with a "golden" book to celebrate his scientific jubilee and his seventieth birthday. Prof. Metchnikoff, whose scientific work in zoology and microbiology is of a high order, is best known to the general public as the author of "The Prolongation of Life" and "The Nature of Man."

At the Laryngological Section of the Royal Society of Medicine on May 27, Prof. Gustav Killian, of Berlin, demonstrated his method of examining the larynx and its annexes by means of a new instrument, the "suspension" laryngoscope. At the same time, a case of cancer of the throat was shown which had been treated by high-frequency electric currents—so-called diathermy—with promising results.

The triennial Parkin prize of 100*l.* in the gift of the Royal College of Physicians of Edinburgh, has been awarded to Dr. Johnston-Lavis. The subject set was, "On the Effects of Volcanic Action in the Production of Epidemic Diseases in the Animal and in the Vegetable Creation, and in the Production of Hurricanes and Abnormal Atmospherical Vicissitudes." The prize essay will be published in book form by Messrs. Bale, Sons and Danielsson, Ltd.

Several important earthquakes have occurred during the past week. On May 26 a violent earthquake, the centre of which may have been in Central or South America, was recorded in European observatories. On May 27 another strong shock was felt at Panama, but again without damaging the canal works. On the same day an earthquake of unusual intensity, which seems to have originated near Tonga, was recorded at Sydney, the disturbance lasting for three hours.

Mr. W. B. Grove, writing from the University of Birmingham, says that any person interested in the study of the Uredinales may obtain a supply of the rare and remarkable parasite, *Puccinia vincae,* in a fresh condition, by sending a stamped and addressed envelope, or other suitable covering, to him at 46 Duchess Road, Birmingham. The specimens show an abundance of the curious debatable bodies called by Plowright "æcidia."

The seventh congress of the International Association for Testing Materials will be held under the patronage of H.M. the Czar of Russia, in St. Petersburg, on August 12–17, 1915. Four days will be devoted to the discussion of the most important problems on testing materials. After the congress extensive excursions in the interior of Russia have been arranged. The offices of the British section of the Association are at the Iron and Steel Institute, 28 Victoria Street, London, S.W.

The council of the Royal Society of Edinburgh has awarded the following prizes:—(1) The Neill prize for the biennial period 1911–12, 1912–13 to Dr. W. S. Bruce, in recognition of the scientific results of his Arctic and Antarctic explorations; (2) the Keith prize for the biennial period 1911–12, 1912–13 to Mr. J. Russell, for his series of investigations relating to magnetic phenomena in metals and the molecular theory of magnetism, the results of which have been published in the Proceedings and Transactions of the society, the last paper having been issued within the period.

Mr. James W. Munro, Wolfe-Barry student in entomology at the Imperial College of Science and Technology, South Kensington, who is engaged in working out the life-history of *Xestobium tesselatum* with regard to the roof of Westminster Hall, will be glad to be informed of any timber known to be affected with this beetle, and whether it would be possible for him to obtain it by purchase or to examine it for living beetles. He adds:—"Owing to the precarious condition of Westminster Hall roof, it is desirable that my investigations be carried out as soon as possible and a large supply of living beetles is the first essential."

Sensational paragraphs on seeing by wire have been going the rounds of the daily Press, but there is no indication in these accounts of anything fundamentally different from the plans that were put forward in the early days of the Physical Society, when the late Mr. Shelford Bidwell, Prof. Ayrton, and others were experimenting with selenium. At that time mosaics of selenium were going to do all that is promised now, but they never did. It may be that Dr. A. M. Low, whose apparatus has been described in perfervid terms in the daily Press, has made some progress, but the published accounts of the invention as "the latest scientific discovery" are absurd.

THE trustees of the Ray Lankester Fund are prepared to appoint the "Ray Lankester Investigator" for 1914. The fund has been founded in connection with the Marine Biological Association of the United Kingdom, and enables the trustees to rent a table at the Plymouth Laboratory of the association, and from time to time to appoint to it an investigator for twelve months. The investigator appointed will be expected during the year to spend a total of five months, which need not be continuous, carrying on his researches at Plymouth. The biologist appointed receives from the trust 70*l.*, of which half is to be paid to him when he enters into occupation of his table, and the other half when the five months' research is completed. Applications should be addressed to the director of the laboratory at Plymouth.

WE notice with regret the death, in his fifty-first year, of Prof. George Dean, Regius professor of pathology in the University of Aberdeen. After a distinguished career as a student in the Universities of Aberdeen, Berlin, and Vienna, Prof. Dean became University assistant to the professor of pathology at Aberdeen. In 1897 he was appointed bacteriologist in the serum department of the Lister Institute, and became senior bacteriologist in 1906. He was the author of numerous medical articles and of contributions to the Proceedings of the Royal Society and the transactions of other learned societies. He also introduced a rapid method of immunisation used in the preparation of diphtheria antitoxin. He was a member of the War Office Commission on Typhoid Inoculation.

THE tragic ramming and sinking of the steamer *Empress of Ireland* in the St. Lawrence River, resulting in the loss of more than one thousand human lives, gives particular interest to the article on the *Aquitania* in *Engineering* for May 29. This article deals at length with the subdivision of the ship by bulkheads and the effect on the buoyancy of flooding several compartments at either bow or stern, or wing compartments. Diagrams and curves are given showing that five compartments from the bow or five from the stern, including the three turbine rooms, may be flooded and still leave a satisfactory margin of safety. With all the wing compartments on one side of the ship flooded (taking 5320 tons of water), the ship would heel to the extent of 26°, which is not in any way excessive, although the contingency of such flooding is so remote as to be declared almost impossible. The fore-and-aft bulkheads on each side of the space occupied by the boilers extend for a distance of 450 ft. and are 18 ft. from the ship's skin, thus securing practically a "ship within a ship." The *Aquitania* left Liverpool for her maiden voyage on Saturday, May 30.

AT the meeting of the Cambridge Philosophical Society held on May 18 the following were elected honorary members of the society:—Dr. H. E. Armstrong; Prof. J. Bordet, the University, Brussels; Madame Curie, the Sorbonne, Paris; Prof. F. Czapek, the German University, Prague; Prof. T. W. Edgeworth David, the University, Sydney; Colonel W. C. Gorgas, Medical Corps, U.S.A. Army; Prof. P. H. von Groth, the University, Munich; Prof. Jacques Hadamard, the College of France, Paris; Dr. G. E. Hale, director of the Mount Wilson Solar Observatory; Dr. François A. A. Lacroix, Natural History Museum, Paris; Prof. C. Lapworth, late professor of geology, the University, Birmingham; Prof. H. Lebesgue, the Sorbonne, Paris; Dr. Jacques Loeb, the Rockefeller Institute, New York; Prof. Arthur Looss, the Government School of Medicine, Cairo; Prof. H. A. Lorentz, the University, Leyden; Prof. M. Planck, the University, Berlin; Lieut.-Col. Leonard Rogers, the Medical College, Calcutta; Prof. Gustav Schwalbe, the University, Strassburg; Dr. Karl Schwarzschild, the University, Berlin; Dr. D. H. Scott, foreign secretary, Royal Society; Prof. E. B. Wilson, Columbia University, New York; A. F. Yarrow, Blanefield, Glasgow; Prof. P. Zeeman, the University, Amsterdam. The society will celebrate in 1919 the centenary of its foundation.

IN *Peru To-day* (December, 1913) an interesting account is given of the anti-yellow fever campaign in Iquitos. This principally comprised measures for the destruction of the mosquito-carrier of this disease, the Stegomyia. Previously 500–600 deaths occurred annually from yellow fever, but since the institution of these measures not a single death from yellow fever occurred during the first seven months of 1913. The cost has been about 300*l.* a month.

"ORGANISMS and Origins" is the title of Prof. Dendy's presidential address to the Quekett Microscopical Club (*Journ. Quekett Microscop. Club,* April, 1914, p. 259). The origin of life was dealt with, and reference was made to Dr. Charlton Bastian's experiments. While admitting that Dr. Bastian's *a priori* position is a strong one, Prof. Dendy doubts if comparatively highly organised beings can be evolved so rapidly as seems to be the case in Dr. Bastian's solutions.

A COURSE of three public lectures on altitude and health has recently been delivered by Prof. Roget, of Geneva, under the Chadwick Trust. The lecturer directed attention to the changes which occur in the blood at high altitudes, to the relative freedom of the air from micro-organisms, and to the richness of the solar light in violet and ultra-violet rays. Exposure of the unclothed body to the brilliant alpine sun of winter exercises a marked curative effect on tuberculous conditions.

WITH reference to the mutations of *Bacillus anthracis* induced by exposure to ultra-violet rays (NATURE, April 23, p. 193), attention may be directed to the power which bacteria possess not only of secreting enzymes, but also of adapting the enzyme they secrete to the soil on which they are growing. Thus a bacterium which has been secreting peptonising enzymes on a protein soil will secrete a diastatic enzyme when transferred to a carbohydrate soil, as was demonstrated by Sir Lauder Brunton and the late Dr. Macfadyen (Proc. Royal Soc., vol. xlvi.).

IN the issue of *Folk-lore* for March, recently issued, Mr. W. Crooke discusses the remarkable vernal fire festival of the Hindus, known as the Holi. A primitive form of the rite is the burning of a tree or pole, apparently symbolising the burning of the old year. To this are added various observances—fire-walking, swinging, burning of bush-fruits—which seem to be connected with the cult of fertility.

AT the last meeting of the Society of Antiquarians of Scotland, Mr. Ludovic Mann discussed certain elaborately carved balls of stone, of which some two hundred examples are known. It was believed that they were found in interments of the bronze and stone ages; but the style of decoration points to the conclusion that they range through the first two or three centuries of our era. Mr. Mann produces some strong evidence to show that they were used as movable poises or weights on weighing beams. He believes that they originated with the Roman *statera,* and that they throw light on the conditions of commerce in Scotland some two thousand years ago.

SINCE oceanography is a subject in which Norwegian physicists and naturalists have taken a prominent part, it is appropriate that a full memoir upon this branch of science appears in the April number of *Naturen.*

SUGGESTIONS with regard to the establishment of special rooms for children in museums are contributed by Mr. W. R. Butterfield, of the Hastings Museum, to the May issue of the *Museums Journal.* To anyone who has watched the aimless manner in which parties of children wander through the galleries of the Natural History Museum, the need and advisability of such special rooms—if only they can be made to attract the class for whom they are intended—will be self-apparent.

THE Zoological Society of Scotland is to be heartily congratulated on the complete success attending the first year's working of the Zoological Park, Edinburgh, of which a full account is given in the report of the council for the year ending March 31, a report notable on account of the number and beauty of the illustrations. Among donations to the menagerie mention may be made of a consignment of antarctic seals and penguins from Messrs. Chr. Salvesen and Co., of Leith, several antelopes and deer from the Duke of Bedford, and an elephant from the Maharaja of Mysore.

A PHOTOGRAPH of the pair of young sea-elephants, or elephant-seals, recently presented by the Duke of Bedford to the Zoological Society forms one of the most striking features in the May number of Mr. Douglas English's *Wild Life.* It is to be regretted that in the accompanying letterpress no mention is made of their place of origin, and the statement that "Head" Island (instead of Heard Island) is one of the breeding places of the species is misleading. It may also be mentioned that "neoteny" (p. 16) is not a term likely to be familiar to the class of readers for whom this publication is intended.

SEVERAL observers have in recent years experimented on the eggs of various animals by means of the centrifuge, with the view of determining the effects upon development of a redistribution of the various constituents of the cytoplasm. The latest contribution to this particular branch of the science of experimental embryology is a long memoir by Dr. J. W. Jenkinson, "The Relation between the Structure and the Development of the Centrifuged Egg of the Frog," published in the *Quarterly Journal of Microscopical Science* (vol. lx., part 1). This author finds that, as a result of centrifuging, the constituents of the cytoplasm are driven past one another in opposite directions, and that this disarrangement brings about distortion of development, or even prevents it altogether. Normal development appears to be conditioned by a definite arrangement of the visible cytoplasmic constituents, with the exception of the pigment. The yolk, glycogen, and fat, not being living substances, cannot, however, be properly termed organogenetic, and no evidence of the existence of distinct organogenetic bodies in the living protoplasm was obtained in the case of the frog's egg. Dr. Jenkinson arrives at the general conclusion, however, that the causes upon which the primary differentiation of the embryo depends are located in the cytoplasm. He maintains that the cytoplasm transmits those characters which determine the large group to which an organism belongs. Generic, specific, and varietal characters, on the other hand, are supposed to be carried by the chromatin substances of the nucleus, which, however, depends upon differences in the cytoplasm for the manifestation of its activities.

ACCORDING to investigations by Mr. J. N. Currie on the flavour of Roquefort cheese (*Journal of Agricultural Research,* vol. ii., No. 1) it has been found that a considerable amount of the fat is hydrolysed during the ripening period. The chief factor in this process would appear to be *Penicillium roqueforti,* which produces a water-soluble lipase, and thus leads to the accumulation of the acids of milk fat in both the free and combined forms. Of these acids, caproic, caprylic, and capric, and their readily hydrolysable salts, have a peppery taste, and are responsible for the characteristic burning effect of Roquefort cheese upon the tongue and palate.

SIR T. H. HOLLAND provides a very valuable bibliographical and critical index to "Indian Geological Terminology" in vol. xliii., part 1, of the Memoirs of the Geological Survey of India. Such lists are seldom readable, being intended only for reference; but in this case a student, going through these well-written pages with a map of India at his side, will learn a great deal about the geology of the country, and, incidentally, about the men who have developed our knowledge and the principles of stratigraphical research.

THE Geologists' Association furnishes in its Proceedings much useful information as to districts visited on excursions, and many of the descriptive papers serve to bring our text-book knowledge up to date. In recent issues a valuable series of papers has appeared on the Aberdeen and Arbroath area (vol. xxiii., part 5). The picturesque regions of southern Mayo and Sligo, still too little known, are described in vol. xxiv., part 2, with eight photographs of scenery and rock-structure; while the Mesozoic beds round

Nottingham are excellently illustrated in vol. xxv., part 2. In this last part, moreover, H. Dewey and R. A. Smith sustain the view that the sequence of Palæolithic culture at Swanscombe, in Kent, is identical with that established in France and Belgium. The publications of local societies also bear witness to the activity of geological observers, and especially of the amateurs who add so much to scientific knowledge in England. H. C. Beasley thus continues the description of the remarkable Triassic footprints at Storeton (Proc. Liverpool Geological Society, vol. xi., part iv.), and D. Woolacott furnishes an important paper on the stratigraphy and tectonics of the Permian of Durham (Proc. Univ. of Durham Philosophical Society, vol. v., part 5).

THE recent memoirs of the Geological Survey of Great Britain, each of which describes a sheet of the series of colour-printed maps, include "The Country around Newton Abbot," by W. Ussher and other authors, and "Fareham and Havant," by H. J. O. White. In the former, Clement Reid confirms Heer's correlation of the Bovey Tracey Beds with continental representatives now classed as highest Oligocene. The map (Sheet 339) includes the edge of the Dartmoor granite, and the seaside resorts of Exmouth, Dawlish, and Teignmouth, and, with the memoir, should be of great service to visitors in this very varied region. The Havant map and memoir pleasantly continue the series devoted to the Downs and the Cainozoic synclines of south-eastern England. Scotland furnishes Memoir and Sheet 82, on Central Ross-shire, and Memoir and Sheet 92, on the Fannich Mountains and Strath Broom. The names of B. N. Peach and J. Horne appear among the authors of both these publications, which deal with wild districts of pre-Cambrian and Cambrian rocks. Despite their moderate price (2*s*. 3*d*. and 2*s*. 6*d*.), both works are illustrated with landscapes which are chosen with the eye of a geologist, but which will equally delight any lover of the highlands. The many students of thrust-structure and mountain-building will find new diagrams and new material in both these interesting memoirs.

"THE Oil Resources of the Empire" formed the subject of an address by Dr. F. M. Perkin, recently delivered before the Society of Arts, and published in the Journal of the society (vol. lxii., No. 3204). It is not generally realised how vast is the consumption of mineral oils in the United Kingdom, and how small a proportion is supplied from within the Empire itself. Out of a consumption of more than four million gallons only 2·67 per cent. was derived from British sources. It is hoped that by systematic surveys new sources of supply may be located, and valuable sources of oil may in future be found in the great shale beds of Tasmania. Much, too, remains to be done in increasing the supply of vegetable oils, more particularly of linseed oil, which might with advantage be produced extensively on British soil. One of the most striking features of recent years has been the rise of the soy oil industry, and in view of the fact that the crushing industry has now fallen largely into Japanese hands, it is suggested that attempts should be made to cultivate the soy plant in British territory.

AMONG recent American papers on the chemistry of soils the following may be noted. Mr. G. W. Wilson, in the *Biochemical Bulletin* (vol. ii., No. 10), reports a series of experiments on the effect of heating the soil on plant growth. It appears that heating the soil to a temperature of 95° C. caused slight acceleration of growth, but a higher temperature (135° to 175°) brought about a marked retardation; plants grown on the heated soil were more susceptible, however, to attack by parasitic fungi. In the same number of the *Biochemical Bulletin*, Mr. A. W. Thomas gives a convenient summary of the methods adopted by Schreiner and Shorey for isolating and detecting organic soil constituents, whilst in the *Journal of Agricultural Research* (vol. i., No. 5, p. 357) Mr. E. C. Shorey describes the isolation of certain derivatives of benzene from samples of sandy soil from Florida at present devoted to orange culture. These compounds were benzoic acid (350 lb. per acre foot), metahydroxytoluic acid (800 lb.), and vanillin (40 lb.), of which the latter at least appears to exist in the soil in the free state, probably being an unchanged residue of plant débris.

VOL. LXVII. of the *Annalen der Physik* contains an important series of four papers, one by Prof. Stark alone, and three by him in cooperation with others, on the effect of electric fields on spectrum lines. Since the discovery of the magnetic change of radiation frequency by Zeeman, various physicists have tried to discover an analogous electric effect. Prof. Stark has succeeded in affecting the spectrum lines emitted by canal rays in a vacuum tube by submitting them to an electric field, ingeniously arranged between a perforated kathode and an auxiliary electrode at a few millimetres' distance. The field intensity amounts to 30,000, and in some experiments even to 47,000, volts per cm. When the observation is made at right angles to the field, the spectrum lines are split up into polarised components under the action of the field, which proves to be rather homogeneous. The separation of the components is proportional to the field intensity. The hydrogen, helium, and lithium lines are studied in detail. For the line $H_\beta$ (4861 Å.U.) the separation of the outer components, which vibrate parallel to the field, becomes about 8 Å.U. in a field of 28,500 volts per cm. In a direction parallel to the electric field the components of the resolved lines are unpolarised. The analogy between the Zeeman effect and the electric effect consists in the spectrum lines being resolved by both kinds of fields; but in all details there are great differences. The magnetic resolution is, with some limitations, the same for all lines belonging to the same spectrum series, and it decreases toward the violet end of the spectrum. The electric resolution is different for succeeding lines of a series, and the effect increases with decreasing wavelengths. Diffuse lines are most strongly affected by the electric field. The two yellow sodium lines show only a very small electric effect. The mechanism of the magnetic effect is certainly understood in its main features, but the exact meaning of the electric effect is still obscure.

LAST week's *Times Engineering Supplement* contains an excellently written article by Prof. J. A.

Fleming on recent scientific research in telephony. It is a description of the practical developments which have been the outcome of mathematical investigations (originated in the first place by Mr. Oliver Heaviside) into the effect of inductance in telephone circuits, followed much later by painstaking experiment and trials on a large scale. A quarter of a century ago, Heaviside's insistence that the solution of the problem of long-distance telephony lay in the distribution of inductance throughout the line met with a cold reception by the engineering department of the Post Office. Heaviside would do no more than expound his theory in his own way, and with his own mathematical notation, leaving its development to the "practicians"; but the practicians of those days were lacking either in the ability or the inclination to study his writings. It is one of the saddest things in the history of British science that Heaviside's work should then have been regarded as possessing no more than an academic value, and that his suggestions did not take practical effect in this country until they had been revived by an American many years later, and sent back to us as a new invention. Prof. Fleming clearly explains the present application of distributed inductance in enabling us to telephone over enormous distances; he describes the "phantom" circuit which permits two pairs of lines to be employed for three conversations simultaneously; he has remembered to mention the effect of reflection at junctions between overhead and underground lines, and concludes with a plea for further systematic investigation; but he has forgotten one thing: Oliver Heaviside's name does not appear once in the article.

THE June issue of the catalogue of Mr. Francis Edwards, 83 High Street, Marylebone, London, W., is concerned with miscellaneous literature, and gives a clearance list of second-hand books in a great variety of subjects. The sections dealing with alpine studies, birds, and general natural history are of special interest.

PROF. WALTER RIPPMANN, who has been for some time actively associated with the movement for spelling reform, asks us to state that though he could subscribe to most of what is said in the review of Mr. Archer Wilde's "Sounds and Signs," signed "W. R.," in NATURE of May 28, the review should not be attributed to him.

The following are among the forthcoming books of science announced by the *Cambridge University Press*:—The Royal Society's Catalogue of Scientific Papers, vol. xiii., covering the letters A and B; The Life, Letters, and Labours of Francis Galton, compiled by Prof. Karl Pearson, 2 vols; The Philosophy of Biology, by Dr. J. Johnstone; Ancient India, by Prof. E. J. Rapson; English Folk-Song and Dance, by F. Kidson and M. Neal; Perception, Physics, and Reality, by C. D. Broad; Philosophy: What is it? by Dr. F. B. Jevons; Mechanical Drawing, by J. H. Dales; Household Science, by C. W. Hale; The Place-Names of Sussex, by R. G. Roberts; Geography of the British Isles, by Dr. Mort; Pond Problems, by E. E. Unwin, and Bird Studies, by W. P. Westell; the *Oxford University Press* will publish shortly The Oxford Survey of the British Empire, in six 8vo volumes, edited by Prof. A. J. Herbertson and Mr. O. J. R. Howarth, in collaboration with seventy-three contributors; and *Messrs. Rivingtons* give notice of A Course of Geometry—Theoretical and Practical, by A. H. Bell, and a cheaper edition of Machine Drawing and Design, by Dr. W. Ripper.

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## OUR ASTRONOMICAL COLUMN.

ROTATING NEBULÆ.—In the *Daily Mail* of May 27 the following cablegram addressed to Prof. Lowell was published:—"Flagstaff, Arizona. Spectrograms show Virgo nebula rotating. Slipher." Up to the time of writing no further information is at hand, and it is not certain which is the nebula in question. The discovery is one of extreme importance, because, although the majority of nebulæ are of the spiral form, and such shape suggests a motion round a centre, a direct determination of the velocity of movement puts this question of movement beyond doubt. The observation is a most delicate one and requires all the resources of modern instrumental equipment and the best of observing conditions.

COLLATED LIST OF LUNAR FORMATIONS.—Selenographers will welcome the issue of the collated list of lunar formations, named or lettered in the maps of Neison, Schmidt, and Mädler, which has been compiled and annotated by Miss M. A. Blagg, under the direction of the late Mr. S. A. Saunder. It was due to Mr. Saunder's energy that a lunar nomenclature committee of the International Association of Academies was formed. Finding that lunar nomenclature was in an unsatisfactory state he desired to remedy the defect by having a nomenclature adopted once and for all by universal assent. This publication therefore forms the basis on which the names of the formations can be adopted. The preparation of an accurate map of the moon in mean libration was also undertaken by Messrs. Saunder and Franz, and it is hoped that this chart will soon be completed. Prof. Turner, in the introduction to the volume, directs attention to the severe losses by death of the committee, namely, Loewy, Newcomb, Saunder, and Franz, necessitating the nominal direction of it being placed in his hands.

THE LIGHT OF STARS.—The March number of *Le Radium*, which reached us a few days ago, contains a paper by Dr. A. H. Pfund, of Johns Hopkins University, in which he describes some preliminary tests he has made of a new apparatus for measuring the light of a star. The work was done at the Allegheny Observatory, the Keeler 30-in. reflector being used. In the focus of the telescope, either of two small blackened discs which formed the junctions of a thermo-circuit could be placed. The wires used for the thermo-element were alloys of bismuth and tin, and of antimony and bismuth respectively. They were enclosed in an evacuated capsule closed at one end by a plate of fluorite and substituted for the eyepiece of the telescope. The thermo-current was measured by a moving-coil galvanometer. The sensitiveness of the arrangement was such that a candle at a distance of eight miles would give a deflection of one millimetre. The deflections obtained from celestial objects were: Vega, 7·5; Jupiter, 3·0; Altair, 2·0 mm. The author hopes by using a more sensitive galvanometer and other materials for his thermo-elements, to increase the sensitiveness considerably, and in this way to open up a new field of astrophysical research.